

CLAIMS

What is claimed is:

- 5 1. A method of generating a halftone image comprised of a plurality of pixels,
each pixel further comprised of two or more sub-pixels, the method
comprising:
 - a. Generating a lookup table providing allowable sub-pixel exposure
configurations;
 - 10 b. Processing the pixels in a sequential order using an error diffusion
technique; and
 - c. Selecting from the lookup table an allowable sub-pixel exposure
configuration for each pixel as it is processed.
- 15 2. The method of claim 1 whereby the lookup table providing allowable
exposure configurations is indexed based on at least one exposure
characteristic of one or more pixels neighboring the pixel currently being
processed.
- 20 3. The method of claim 2 wherein the neighboring pixels, used in selecting from
the lookup table, have already been processed.
4. The method of claim 3 wherein the neighboring pixels are adjacent to the
pixel currently being processed.
- 25 5. The method of claim 1 whereby the allowable exposure configurations
provided by the lookup table each comprises a justification value and an
exposure level.

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6. The method of claim 5 wherein the justification values and exposure levels provided by the lookup table are consequent to sub-pixel capabilities of an output device for which the halftone image is generated.
- 5 7. The method of claim 5 whereby the justification value of an allowable exposure configuration is either left or right.
8. The method of claim 5 wherein the step of selecting further comprises setting the justification and applying a tone associated with the exposure level of the
10 selected allowable exposure configuration.
9. The method of claim 8 whereby the exposure level setting for at least one of the allowable exposure configurations corresponds to no tone being applied.
- 15 10. The method of claim 1 wherein, for the pixel currently being processed, the step of selecting from the lookup table is based on (i) an exposure characteristic of one or more neighboring pixels and (ii) a modified input value for the pixel currently being processed.
- 20 11. The method of claim 10 wherein the step of selecting an allowable exposure configuration further comprises comparing the modified input value for the current pixel with allowable exposure configurations provided by the lookup table.
- 25 12. A method of generating a halftone image for an output device using error diffusion to process a plurality of pixels in a sequential order, said output device having sub-pixel addressability, the method comprising:

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- a. Creating a lookup table indicating one or more allowable exposure configurations for a currently processed pixel based on exposure characteristics of one or more pixels neighboring said current pixel;
 - b. Accessing the lookup table for the current pixel;
 - 5 c. Identifying the allowable exposure configurations for the current pixel;
 - d. Selecting an allowable exposure configurations for the current pixel; and
 - e. Applying the selected allowable exposure to the current pixel.
- 10 13. The method of claim 12 whereby said one or more neighboring pixels are comprised of pixels adjacent to the current pixel.
- 15 14. The method of claim 12 wherein the step of selecting one or such allowable exposure configurations further comprises comparing a modified input value for the current pixel with allowable exposure configurations provided by the lookup table.
- 20 15. The method of claim 14 wherein the step of comparing a modified input value to select an allowable exposure configuration comprises identifying an exposure configuration having an exposure level closest to said modified input value.
- 25 16. The method of claim 14 further comprising the step of differencing the modified input value of the current pixel and applied exposure to generate a present error value to be propagated forward in the error diffusion processing.
17. The method of claim 12 wherein each allowable exposure configuration is comprised of a justification and an exposure level setting, said justification and exposure settings being consequent to capabilities of the output device and the sub-pixel addressability.

18. The method of claim 17 wherein the step of applying further comprises the steps of setting the justification and applying the exposure level.
- 5 19. The method of claim 17 whereby the justification setting of an allowable exposure configuration is either left or right.
20. The method of claim 17 whereby the exposure level setting for at least one of the allowable exposure configurations corresponds to the application of no
10 tone.
21. A method of processing an image using error diffusion to generate a halftone image for an output device having sub-pixel resolution, the method comprising:
- 15 a. Generating a lookup table
- i. indexed by possible exposure characteristics of one or more neighboring pixel to a current pixel, and
 - ii. indicating allowable exposure configurations for the current pixel, each allowable exposure configuration comprised of a justification
20 value and an exposure value;
- b. As each pixel is processed as the current pixel using the error diffusion technique
- i. Determining the exposure characteristics of one or more neighboring pixels which have been processed previous to the
25 current pixel;
 - ii. Calculating a modified input value for the current pixel;
 - iii. Referring to the lookup table based on the exposure characteristics of at least one pixel neighboring the current pixel to identify allowable exposure configurations for the current pixel;

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- iv. Selecting from the allowable exposure configurations by comparing the modified input value for the current pixel with an exposure level associated with each allowable exposure configuration; and
- v. Applying the selected allowable exposure by setting the justification for the current pixel and applying the tone associated with the exposure level.

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22. The method of claim 21 wherein said neighboring pixels are adjacent to the current pixel.

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23. The method of claim 21 wherein the step of comparing the modified input value comprises identifying exposure level of the allowable exposure configurations closest to the modified input value of the current pixel.

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